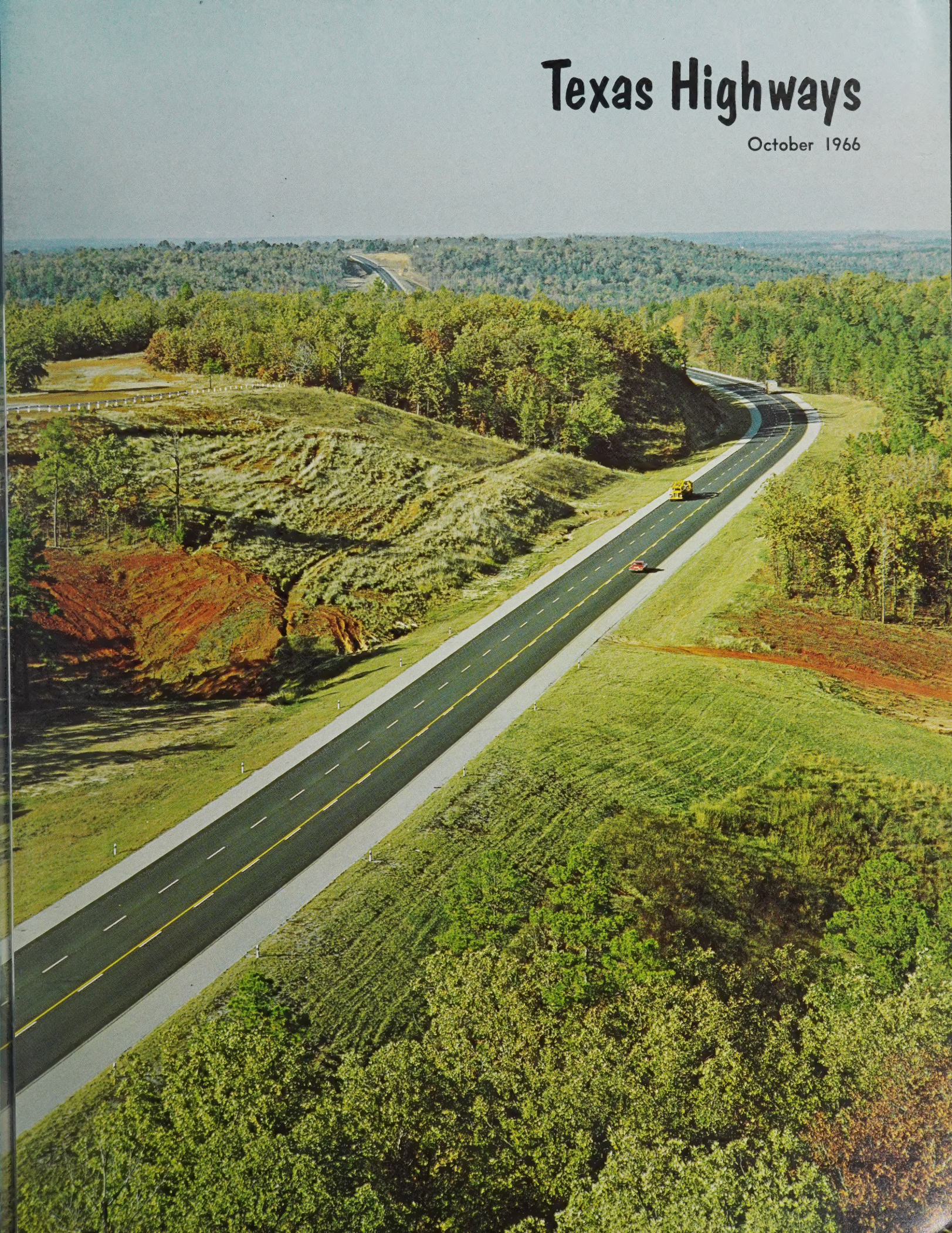
Texas Highways

October 1966



A city divided: Photogrammetry's aerial camera shows equal parts of Texas (left) and Arkansas where U.S. Highways 59 and 71 slice through downtown Texarkana. The building on neutral ground in the center is the Post Office. Photograph by Automation Division

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About Our Cover

On a crisp, sunny October day in Texas, beautiful highways beckon. This one is U.S. 69, winding through the rolling East Texas landscape of green grass and greener fir trees. Here, three miles north of Jacksonville, a bright yellow truck begins the long climb up a hill smoothed by photographer Jack Lewis' perspective.

Where the Action Is

August was truly the month of heroes. Webster says a hero is a person of distinguished valor, a person regarded as a model of noble qualities.

These definitions certainly fit the actions of four highway maintenance men during flash floods in August, when they were instrumental in saving lives and property in District 22. (See story page 12, and To and From Our Readers.)

Aside from their bravery, we think there are two things that stand out about these highwaymen—two things that seem typical of our maintenance men. First, they were quick to *analyze* the situation and to see what needed to be done. And second, they did not have to be *told* to act.

For the past two years flash floods have taken their toll in West Texas. And each time our highwaymen have been where the action is. In 1965, Agustin Maldonado saved two women in a flash flood at Sanderson. This year R. S. Cox, Bayles Roe, Everett Roe, and Billy Downum came to the rescue. The first three men saw action during the flooding, Cox in Garner State Park, the brothers Roe at Bull Head Creek northwest of there. Ten days later Downum rescued a woman struggling in a river near the park.

Another thing about the maintenance men during the flash flood rescues—after they had saved several lives they organized their men to handle traffic and began dispatching important information by radio and telephone. As one woman remarked later, "The one area of calm efficiency, communication, and helpfulness was your highway maintenance station with its crew of men, trucks, and radios."

For his splendid work in rousting sleeping campers from the park in the early morning hours of August 6, Cox was given a commendation by the Texas Parks and Wildlife Commission. Members of the Texas Highway Commission added their congratulations: "We are proud of the Texas Highway Department's tradition of helping people in trouble and proud of you for carrying on that tradition."

We have saluted individual acts of bravery on these pages before, and we will continue to do so. Such men deserve public recognition, and TEXAS HIGHWAYS would like to add its commendation for actions in the "highest traditions of public service."

Houston is justifiably famous for its "spaghetti bowl" of freeways, frontage roads and overpasses spilling over the landscape, and now, just for dessert, Highway Department engineers have dubbed their latest concoction the "grape arbor."

Interstate 10 construction proceeds under a prestressed concrete girder structure that will carry two tracks of the Southern Pacific Railroad. Five traffic lanes, a shoulder and median will pass under each of the two long spans of the underpass, while trains cross diagonally overhead. During construction, trains are routed over shoofly tracks.

Prestressed "Grape Arbor" Spans I.H. 10

Farland Bundy, Bridge Designing Engineer
Bridge Division, Austin

UNUSUAL PROBLEMS call for unusual solutions, and the latest evidence of this in the Highway Department is the unique railroad underpass under construction in Houston over Interstate 10.

Coming into Houston from the west, I.H. 10 crosses many streets, railroads and other utilities which must retain their continuity over or under the broad lanes of the expressway.

One of the most difficult of these crossings is the one required at the twin tracks of one of the main lines of the Southern Pacific Company northeast of Memorial Park near Washington Avenue in West Houston. I.H. 10 at this location requires ten 12-foot lanes (five in each direction), a 20-foot median and two 10-foot outer shoulders. Because of grade lines, scarcity of borrow material, and the inherently superior operation of a depressed freeway interchanging with cross streets, Highway Department engineers decided that I.H. 10 should underpass the railroad rather than overpass it.

For undercrossings of various roads and railroads on this section of I.H. 10, it is necessary to have one pier in the center of the 20-foot median and flanking piers near the edges of the outer shoulder, making spans of about 85 feet for a normal, or perpendicular, crossing.

But this crossing was not a normal one. The railroad at this point crosses I.H. 10 at a skew angle of about 63 degrees. With conventional construction, the double tracks across the freeway lanes at this angle would require spans approximately 185 to 190 feet long.

Freeway grades were established as low as practicable to allow for drainage without pumping, and a three-foot railroad track raise was agreed on to give maximum head room for vertical clearance. (A higher track raise would have prevented the Southern Pacific Company from serving industrial property in the vicinity of the underpass.) With these grade adjustments, the designers were able to allow 15-feet, six-inch minimum vertical clearance from roadway surface to the low point of the superstructure, and still have a working depth of slightly over eight feet from the top of the rail to the low superstructure. The two tracks are spaced 14 feet center to center.

Engineers quickly recognized the difficulty of providing spans at this location to carry two tracks of rail loading. (The design loading used is Cooper's E72 with diesel impact allowance.) They made studies of two conventional type systems that would satisfy the design requirements:

1. A through truss continuous over two spans of 190 feet each. Two trusses would be constructed 35 feet on centers with a floor beam and stringer system to carry both tracks. Truss depth was 38 feet center to center of chords.

2. A through girder system utilizing a central plate girder 16 feet deep and two outer girders 14 feet deep with a floor beam, knee brace and stringer system to carry the two tracks.

Low alloy steels were utilized in both designs where they appeared to give economy. Both of the designs required

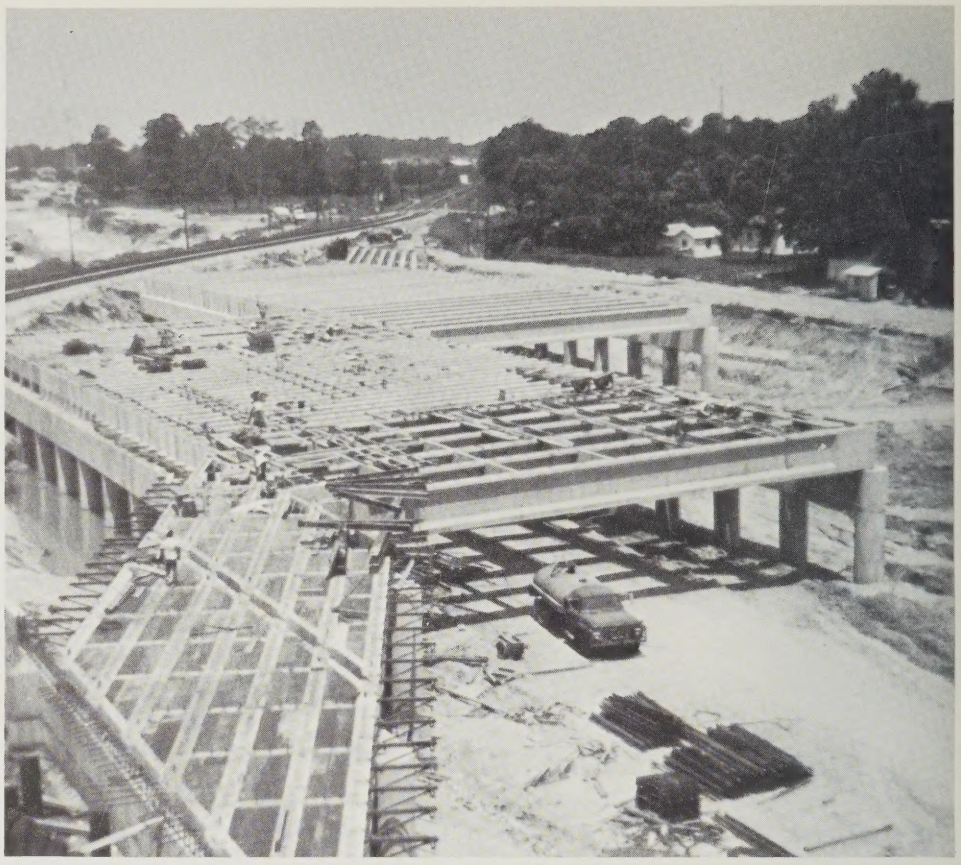
complicated steel fabrication, and in an area so near the coast both structures would require frequent painting and maintenance. Another drawback to both designs was that since all supporting members would be above track level, the structures would be much more vulnerable to damage from train derailment.

Engineers of the Houston Urban Project Office and the Southern Pacific Railroad suggested that studies be made for a different type system to carry the tracks across the roadways. This system involves a broad expanse of beam, all perpendicular to I.H. 10, and located for a sufficient distance along the highway as to provide the necessary support for the tracks. Engineers call it the "grape arbor" because the beams and diaphragm system form a latticework or arbor design.

Two designs were prepared for the arbor system, using structural steel plate girders for one and prestressed, precast concrete girders for the other.

Estimates for the four designs for the railroad underpass show great variation in cost:

Through Truss Structural Steel	$1,150,000
Through Plate Girder Structural Steel	950,000
"Arbor Type" Structural Steel Girders	850,000
"Arbor Type" Prestressed Concrete Girders ...	650,000

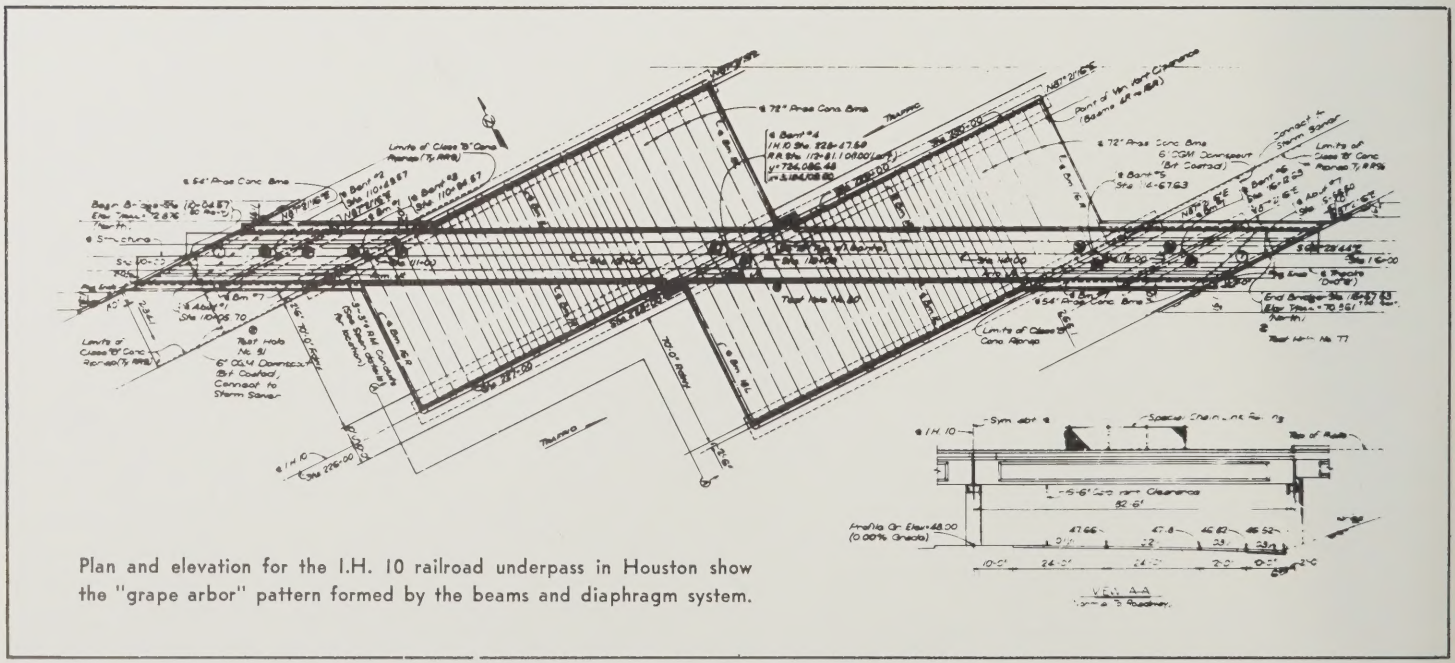


The diagonal crossing of the railroad tracks at a 60 degree angle and the "grape arbor" pattern of construction is shown in this view of the I.H. 10 underpass in Houston.

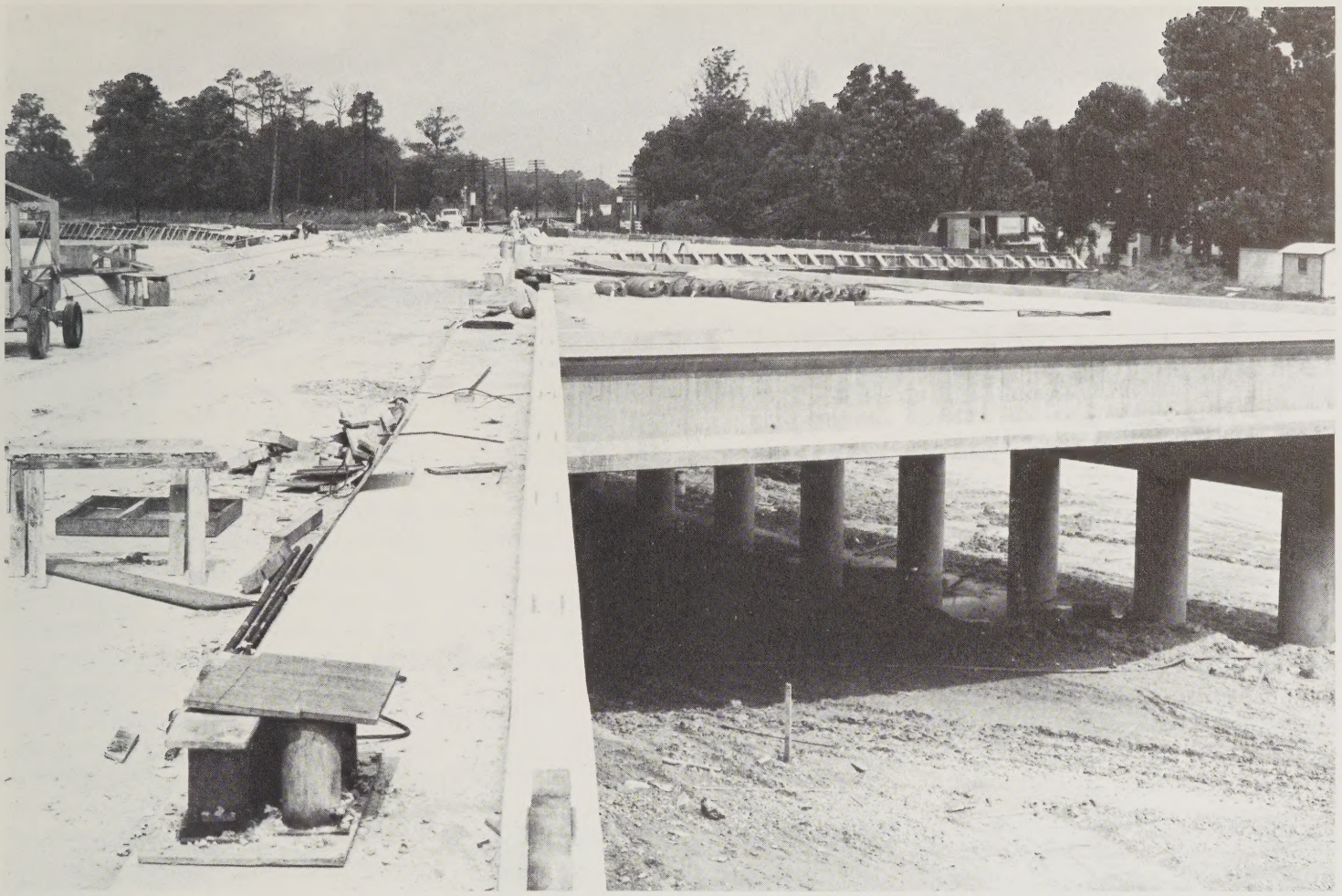
(Cost estimates included an allowance for engineering and contingencies, but not railroad work for shoofly tracks, track work and ballast, and utility adjustments.)

We chose the prestressed concrete girder design because of its lower initial cost, and lower maintenance cost.

Foundation material consisted of clays and sands, and promised 60-ton bearing capacity with displacement type piling at 20 to 30-foot pile lengths. With this



Plan and elevation for the I.H. 10 railroad underpass in Houston show the "grape arbor" pattern formed by the beams and diaphragm system.



Sighting along the route of the railroad track; Interstate 10 eastbound lanes will be directly underneath.

Photograph by Albert Drew

type foundation the prestressed concrete girder design's additional dead load would not be unduly penalized.

Detailed plans for the underpass were prepared by the Bridge Division, and construction is under the supervision of the Houston Urban Office. Prestressed beams for the structure were fabricated by Rackle Division of Trinity Products of Houston. Successful bidder for the construction was Trinity Builders of Houston.

Each span across the main lanes contains 34 prestressed, precast girders 72 inches deep with 48 half-inch prestressing strand (250 K). These girders are spaced at four feet, six inches on centers and nine feet on centers, and are placed perpendicular to the centerline of I.H. 10. The closer girder spacing is used for those girders that support the tracks near their midspan.

At the insistence of the railroad, one additional buffer beam was placed in each span on the side of approaching traffic to serve as a crash beam for overheight highway loads. If this beam is damaged, it can be replaced without disrupting rail traffic. Also at the insistence of the railroad company, those areas of slab not occupied by the actual track and ballast section were decked with a solid seven-inch slab.

This design gives an interior pier that is 356 feet in length, and two flanking piers which are each 230 feet in length. The 85-foot long, 38-ton beams were set in place by a single large crane.

During construction of the underpass, rail traffic is being carried by a two-track shoofly detour.

In developing this project, consultations were held with prestressed concrete fabricators to determine an appropriate price for the 72-inch deep prestressed beams. This resulted in our estimating a cost of approximately $25 per linear foot for these beams, fabricated and erected in place.

Cost records of the successful contractor indicates the $25 figure to be appropriate for the beam cost for this project, although his bid price was $40 per linear foot. This caused the apparent cost of the structure, including engineering and contingencies, to be $750,000, some $100,000 higher than the original estimate but still $100,000 under the estimate for the next most economical design.

Several interesting features about this structure might be noted. First, although there is no justifiable reason for anyone other than trainmen to walk on the broad structure, a six-foot chain link fence has been placed around the entire periphery to discourage people from jumping or throwing objects over the side onto the highway lanes below. Second, a lighting system underneath the bridge is necessary because of the tunnel effect of the long expanse of spans over the expressway.

We believe this unique structure provides another example of the versatility of prestressed concrete in providing economy for the taxpayer in highway construction. ■

Leon Hawkins Wins Hewes Award

LEON HAWKINS showed no outward signs of emotion when he was told he had just been named recipient of the coveted Dr. L. I. Hewes Award for "an outstanding contribution to highway development."

"Well, that's nice," was Leon's only comment. That was his first reaction. Shortly afterward, he became a little more talkative, admitting that winning the $500 award was "real nice," but that recognition of his work was something that meant a lot more.

Award winner Leon Hawkins displays a universal slip joint that is being studied for possible use on highway sign supports.

The Hewes Award is given each year during the annual meeting of the Western Association of State Highway Officials. This year State Highway Engineer D. C. Greer accepted the award for Hawkins at the WASHO meeting in Sun Valley, Idaho, on September 8.

Greer described Hawkins as "one of the Department's veteran engineers who has worked long and hard for better, safer highways."

He added: "We at the Texas Highway Department are justifiably proud of Mr. Hawkins and his outstanding contribution to highway development."

In ceremonies on September 16 before a packed Big Hearing Room crowd at the Highway Building in Austin, Greer proclaimed it a "banner day in the history of the Highway Department" as he presented the Hewes Award certificate to Hawkins.

He described Hawkins to the gathered representatives of the Department of Public Safety, safety organizations, industry, press, and Highway Department employes as a "quiet professional."

"He expresses his concern for those who use the highways by the determined use of his professional skill, finding solutions to make Texas highways safer. Leon richly deserves this award.

"It is particularly fitting that this presentation be made at this time. Next week marks the observance of Highway Week. Leon Hawkins' work dramatically illustrates the Highway Week theme, 'Better highways save lives ... time ... money.' "

Hawkins accepted the certificate with characteristically few words, "To be nominated for this award was an honor, and to be a recipient is a very high honor indeed, one that I am very, very proud of."

Greer completed the presentation by handing Hawkins, "A little something

for your wife," the $500 check that accompanies the Hewes Award, and by proclaiming September 16 "Leon Hawkins Day."

Hawkins is credited with having developed the original concept, and with guiding the research program, of the breakaway sign support that is now being installed on signs along Texas highways. The breakaway signs yield on impact when struck by a moving vehicle. (See TEXAS HIGHWAYS, March 1965, September 1966.)

The Highway Department became concerned with the potential hazards of rigid sign supports when the number of persons fatally injured in collisions with the highway signs jumped from 15 in 1963 to 31 in 1964. In the same period the number of injuries rocketed from 246 to 400.

The Bridge Division, which is responsible for designing all sign supports for Interstate highways, was charged with developing a safer sign. Hawkins, a supervising designing engineer, was named to supervise the project.

Hawkins reasoned that vehicle deceleration forces could be kept to passenger survival limits by permitting a colliding vehicle to penetrate through and beyond the sign support. This would involve some provision for the post to release from the foundation.

He also deduced that the supports must follow definite and predetermined paths leading away from the windshield area.

Proclaiming September 16 "Leon Hawkins Day," State Highway Engineer D. C. Greer presents a certificate to the Maintenance Operations Division supervising maintenance engineer honoring him as recipient of the Dr. L. I. Hewes Award for 1966. Greer also passed to Hawkins "a little something for your wife," the $500 check that accompanies the award.

These two seemingly simple premises were subjected to intensive research at Texas Transportation Institute, Texas A&M University. Crash tests involving actual vehicles and signs proved the soundness of the Hawkins theory with application of a "slip joint" to link the sign support to the foundation. A later refinement was a welded "hinge" on the support to control the trajectory of the released post.

The Highway Department installed the first of the new sign supports for field tests in November 1965. Since that time nearly 30 vehicles have crashed into the signs, with no reports either of injuries or fatalities and only relatively minor vehicle damage. Three of the signs had been involved in fatal accidents before the "breakaway" supports were installed.

"Breakaway" sign supports are now required in original construction contracts for Interstate and expressway projects. Existing signs throughout the state are being modified by Department maintenance forces to incorporate features of the breakaway support.

The Hewes Award was initiated by Western Construction Magazine of San Francisco to honor the late Dr. L. I. Hewes, long-time regional chief of the U. S. Bureau of Public Roads. It includes a $500 cash award as well as an appropriate plaque.

Hawkins received his bachelor of science degree in civil engineering from Texas A&M University in 1937. He joined the Texas Highway Department in 1952 after earlier work as an urban and consulting engineer. He served in the navy as a lieutenant (JG) during World War II.

He transferred to Maintenance Operations Division July 1, but he took the sign support work with him. In addition, Leon works with the districts on bridge maintenance problems. ■

HIGH RISE illumination

HOUSTON URBAN OFFICE engineers, under the direction of Engineer-Manager A. C. Kyser, are pioneering in the field of highway illumination.

Modifications in design and equipment that the Houston Urban Office has put into effect in freeway lighting have resulted in savings through less expensive construction, service, and maintenance, while at the same time have provided a more uniformly lighted pavement with less glare—in other words, a safer highway for the motorist at less cost for the taxpayer.

When designing the illumination system for the Central Interchange on Interstate 45 in downtown Houston, engineers saw that the use of the usual illumination standards with 400-watt luminaires mounted 30 feet above the pavement would be an extremely expensive installation—and one that would make the interchange look like a gigantic pincushion because so many lights would be needed.

To reduce costs and avoid the unsightly appearance that a conventional design would cause, construction plans for the Central Interchange called for 40-foot mounting heights and 1000-watt luminaires. Far fewer standards were needed with this plan because they could be spaced farther apart.

The interchange of U.S. 59 (Southwest Freeway) and Interstate 610 (West Loop) was also illuminated according to the new plan with 1000-watt luminaires mounted 40 feet high. Construction costs of the two illumination projects were reduced about 38 per cent as a result of the design modification.

Following these two projects, an illumination research project was begun at the Texas Transportation Institute at Texas A&M University. The Texas Highway Department is directing the study, and it is being financed by the U.S. Bureau of Public Roads.

Even higher mounting heights and longer spacings between luminaires have resulted from the research. Four hundred-watt luminaires are now mounted at 40 feet with approximately 240-foot spacings, and 1000-watt luminaires are mounted at 50 feet with 300 to 330-foot spacings. The heavy, rigid median rail used on urban freeways has made installation of these lighting standards in the median feasible. Though erected to

Photographs by Albert Drew

A row of 1,000-watt luminaires mounted on 50-foot standards and installed in the median barrier brighten Houston's Southwest Freeway.

prevent head-on collisions, the median rails also protect the light standards.

Two contracts are currently underway in Houston on this basis. The projects are on I.H. 10 from U.S. 59 east to I.H. 610 (East Loop), and on U.S. 59 from downtown Houston west to its crossing of Westpark Drive. Also, the West and North Loops of I.H. 610 from U.S. 59 north and east to I.H. 45 will go to contract for similar lighting in the near future.

Dexter Jones, supervising designing engineer, Houston Urban Project, says that to his knowledge the Central Interchange illumination system was the first highway system in the United States to have the higher wattage luminaires and higher mounting heights.

Several other innovations in equipment and design are also being utilized in lighting freeways. Unitized duct cable, in which plastic conduit is extruded around the electric conductors, is now being used in place of the usual conductors to ease construction and maintenance problems.

Luminaires of various wattages and various light distribution patterns are being installed to fit the needs of the geometrics. Varying wattages are used at the ends of continuously illuminated sections of freeways so that the light level is decreased gradually.

Each contract for illumination of a new section of freeway includes modification of the light standards on adjacent sections of the freeway, including the installation of the new cast aluminum breakaway bases. These bases are similar to those described in the April 1966 issue of TEXAS HIGHWAYS. Fused connectors with molded rubber housing are placed in all standards for electrical isolation and ease of maintenance. Their use, along with the breakaway base, reduces the severity of the accident if a vehicle collides with the standard.

Through the use of imagination and research, Houston Urban Office engineers have provided Houston motorists with safer, glare-free freeways while reducing the cost of installation and maintenance of luminaires. ■

Dexter Jones, supervising designing engineer in the Houston Urban Project, stands beside an older installation, 30-foot standards supporting 400-watt luminaires. Forty-foot standards are now used for the 400-watt luminaires. In the background are the taller, 1,000-watt lights.

Beware the Red Arrow

"Red Means WRONG," and if you drive the wrong way on a Texas freeway, you will soon see lots of red, thanks to the Texas Highway Department's latest move to prevent accidents caused by wrong-way freeway traffic.

The Department announced in August it will begin installing red traffic buttons and reflective pavement markers on Interstate and other controlled access highways in Texas.

"The thing for drivers to remember," a Department spokesman said, "is that red means WRONG.

"If you see a red arrow pointing at you from the pavement as you start to enter the freeway ramp, you are entering the wrong way," he added.

"If you see a straight, red line on the lane lines of a freeway, you are going in the wrong direction. Get off the freeway or get turned around fast."

Installation of the markers is the Department's second major innovation this year to minimize wrong-way movements on freeways.

Earlier the Department began supplementing its "Do Not Enter" signs along freeways with "Do Not Enter Ramp" signs and "One Way" signs in the freeway median.

In an effort to cut wrong-way accidents even more, the Department then began experimenting with the reflective, red ramp arrows and freeway lane lines. Both the arrows and lane lines are made up of plastic markers which are highly reflective. They show white to traffic going the right way and bright red to traffic going the wrong way.

The lane lines in most cases will be limited to metropolitan areas where there is a high volume of traffic. Reflective markers for the lane lines will be placed on 80-foot centers unless the grade is greater than 2 per cent. Then 40-foot spacing may be used.

The arrows will be placed on all exit ramps to two-way frontage roads, on all exit ramps that have had any history of wrong-way entry and on all exit ramps where the connection with the cross street or highway is such that traffic may have easy access to the exit ramp for wrong-way movement.

"The Texas Highway Department has been concerned for some time with the problem of wrong-way accidents on our freeways," State Highway Engineer D. C. Greer said.

"We hope these new markers will help solve the problem by warning motorists that 'red means WRONG.' " ■

Esthetic brickwork and twin towers linked by eight huge brass cables marked the Waco suspension bridge. In this 1910 photograph, strollers take their time crossing the bridge. And well they might—the sign under the arch warns of a fine for "riding or driving over this bridge faster than a walk." Posters advertise "Duke's Mixture," "Bull Durham," and "Old Virginia Cheroots."

Photographs courtesy *Dallas Morning News*

Through the years artists have been inspired by the Waco suspension bridge. Although the brickwork and twin towers were covered with stucco and new arches were added between the towers, the bridge today is still beautiful and still functioning.

By Carol Nation
Texas State Historical Survey Committee

Waco

ONE HUNDRED YEARS ago, the people of Waco embarked on a major Texas first that made a significant contribution to the state's development: the construction of the first bridge to span the winding Brazos River.

The river, longest in the state, has headwaters in New Mexico and empties into the Gulf of Mexico. Treacherous with sand and meandering main channels and rampaging floods, the river claimed a host of lives and property in early days as pioneers forded the river.

So it was no wonder that a great celebration marked the opening of the Waco suspension bridge in January 1870. At the time, it was the third largest suspension bridge in the world, and the only one "south of Minneapolis." For years it was the only bridge across the Brazos, making Waco famous as an east-west crossing.

Travelers and bridge designers went hundreds of miles out of their way to see the sensational bridge, because for a long time it was the longest single-span suspension bridge in the United States. Today, many tourists still stop to see the historic structure.

The bridge engineer, youthful Thomas M. Griffith of New York, was associated with the bridge building firm of John A. Roebling & Son that later designed the Brooklyn Bridge, patterning it after the one in Waco. One of the Waco bridge promoters, Richard Coke, became a Texas governor, and another, William L. Prather, later was president of The University of Texas.

Building the great bridge was not a simple task, as witnessed by hundreds of "riverside superintendents." Engineer Griffith had to improvise or haul in machinery, train workers, and argue with the money-conscious bridge company men. Griffith wanted stone for the tow-

Bridge Nears Centennial

Bridge history supplied from the files of *Texas Parade* magazine.

ers, but the bridge company insisted on cheaper bricks that could be made at Waco. Ultimately 2,000,700 bricks went into the bridge.

Huge coils of steel strands, trusses and other steel necessities from the John A. Roebling & Son bridge building firm of New Jersey had to be hauled to Waco from the nearest railhead 140 miles south at Millican. Hauling costs alone added $8,276 to the price of steel for the bridge.

The cables were constructed by Roebling in New York and sent down the coast by boat to Galveston, and then overland by freighter to Waco.

Because there was no railroad in Waco, all materials were brought in by ox wagon. Ironically, a year after the bridge was completed, the first train came puffing into Waco and the city became an important transportation center for growing Texas.

It cost $140,000 to build the Waco bridge. You might think it would cost a great deal more to build the bridge today, but surprisingly, Highway Department bridge engineers estimate they could build a wider, longer steel girder bridge for $40,000 less today. The accessibility of materials and trained men accounts for the lower cost.

The bridge was not a pioneer project of the Texas Highway Department. Financed by a private bridge company, it was first operated as a private toll bridge that from its beginning earned $100 a day. Horse drawn vehicles with more than two horses paid 20 cents a wheel and five cents for each animal. A mounted rider paid 10 cents. Large livestock cost five cents; smaller livestock, three cents.

The toll sparked a controversy that divided the people the bridge had bound together. And within two years, grumblings mounted to an open clash. One faction clamored for a free bridge; the opposing faction labored to prevent ford traffic near the toll bridge. The city sought to evade the bridge monopoly, but the bridge company won a district suit to protect its river-crossing monopoly, and the controversy raged on.

Finally, in 1889, the company sold the bridge to McLennan County for $75,000. Several months later, the county conveyed the bridge to the City of Waco for $1. The gigantic opening ceremony of the free bridge rivaled the original celebration.

During the days of toll taking, the small houses covering the cable terminals, or anchors, were used as offices for toll collectors. These later were occupied by tradesmen, and sometimes even families lived in them. A murder was committed in one of them in 1926. When the bridge was reinforced and repaired in 1929, these houses were sealed up with the layer of stucco that was placed over all the brick work.

The bridge is a chronicle of Waco's progress. In 1870, when it opened, Waco was a village of 3,618 people menaced by Indians. Today, Waco is a city of 107,500. Steer-yoked schooners, horses and livestock first traversed the bridge, followed by the first automobiles. Today, streamlined traffic flows across the bridge, and much of Waco's commerce hinges upon the bridge because of its ideal location.

It also reflects Texas history. Waco was the center of the secession movement in Texas, as most of its early settlers were from the Old South. During the Civil War, Waco dwindled to a village of 1,500 people torn by economic chaos. Texas reentered the Union the same year the bridge was opened, 1870, and Federal cavalry companies trotted over the bridge during the days of reconstruction.

The bridge caused Waco to become a major crossroads of early Texas. People in hordes were moving from the Old South to Texas, and other people moved from East Texas farther west by way of Waco. Oldtimers in West Texas told their children and grandchildren stories of crossing the big bridge on their way west.

Thomas Griffith did his work well. The bridge has withstood tremendous loads, storms and overflows of nearly 100 years now. But in 1903, some people in Waco decided that the bridge was unsafe and they wanted a new, modern steel structure to supplant the old landmark. Citizens of Waco who wanted to keep the old bridge opposed them by recalling Griffith for an inspection of his work. A group of engineers accompanied Griffith to Waco, and after a thorough inspection of cables and anchors, they proclaimed that the structure was as fit and safe as it was on the day of its opening.

It still stands, and in beauty despite renovations and additions. The sweep of the cables, their swaying movement even to a dog's trot across the structure, have not been lost.

A 1933 *Dallas Morning News* account of the bridge construction tells about a man who worked on the bridge, Emanuel Vreeland, a Negro blacksmith. At the time, he was thought to be the only living man who had helped build the bridge.

"It was a mighty big job welding the huge cables to the anchor dogs," reminisced Vreeland. "We first had to get them in place, and they weighed many tons. Then we tied them so fast that they are still holding to this day. I guess we done a pretty good job all right." ■

"In the highest traditions of public service . . ."

Highwaymen Save Flood Victims

The Texas Highway Department is people—people who care. Though it is one of the largest State agencies, the Highway Department is not a machine that replaces feeling with red tape. The Department tradition of helpfulness to people in trouble got dramatic emphasis recently when heavy rains caused flooding in the ranching country of District 22. E. A. Boehme, right of way agent in Del Rio, reports two instances . . .

Paul Revere Rides Again

Unlike the Paul Revere who in 1775 made a midnight ride through Lexington and Concord to arouse his Minutemen with the cry, "The British are coming!" R. S. Cox, maintenance construction foreman in Leakey, drove a pickup at dawn through the camping area of Garner State Park broadcasting, "High water is coming!"

R. S. was awakened by a heavy downpour of rain at four on that fateful Saturday morning, August 6. He checked his rain gauge and discovered almost six inches of rain had fallen.

After he gathered his men to patrol highways and assist traffic, Cox found that the Frio River north of Leakey was on the rise. He drove south and discovered that rain-swollen creeks were emptying into the Frio.

Cox realized the river would soon carry a deadly wall of water into the low-lying camping grounds of Garner State Park. He radioed his base station to alert Garner and all camps along the Frio that high water was on the way.

When he arrived at the park at 6 a.m., he learned that some 2,500 campers still had not been alerted. They were sleeping peacefully in cottages, campers, tents, and under tarpaulins, unaware of the approaching flood waters.

Joined by two park supervisors, Cox assumed his Paul Revere role, driving through the camping area to broadcast an evacuation alarm over the loudspeaker of his pickup truck.

"Wake up, move out, high water is coming!" he yelled.

The sleeping campers did not respond, and Cox and his two helpers abandoned the truck and set out on foot to warn each group of campers.

R. S. recalls that at one tent the aroused occupant handed a dollar bill through the tent flap, indicating that he had failed to pay his camping fee and thought the park supervisors had found him out.

Within a short time, 40 per cent of the camping grounds were under water —up to 20 feet at the lowest spots. But all campers escaped to higher ground, without a single injury or loss.

The official rain gauge at Leakey recorded 10.6 inches of rainfall in an eight-hour period that Saturday morning. Every road in Real County was closed at one time or another during the day. The Leakey maintenance crew, under Cox's supervision, performed outstanding service by dispatching flood and highway information by radio and telephone, and by handling highway traffic during the danger period.

For his part in alerting campers at Garner State Park, Cox received a resolution of commendation from the Texas Parks and Wildlife Commission expressing "its heartfelt gratitude to Mr. R. S. O. Cox for this valorous feat of this fine State employee."

"And this isn't the lowest point in the park," R. S. Cox expostulates as he demonstrates the level of flood waters in a service area of Garner State Park.

To this commendation, the Texas Highway Commission and State Highway Engineer added their congratulations:

"Your accurate appraisal of an extremely dangerous situation and your quick and effective action at the hazard of your own safety are in the highest

Campers slept peacefully here in Garner State Park while a death-dealing wall of water rushed headlong toward them. Thanks to the efforts of R. S. Cox and his park-attendant companions, all were saved.

traditions of public service of the Texas Highway Department.

"Your fellow workers in the Texas Highway Department throughout the state can take pride in your accomplishment as an outstanding example to each of them."

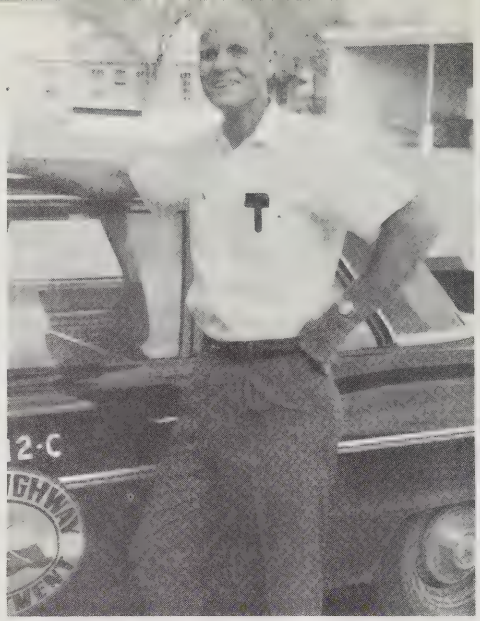
Operation Rescue

On the same morning Cox shouted his high water alarm at Garner State Park, two brothers, both Highway Department employes, staged a daring rescue of two families trapped by rampaging flood waters of Bull Head Creek in Real County.

Bayles Roe, maintenance construction foreman at Rocksprings, and his brother Everett, maintenance construction foreman at Barnhart in District 7, were attending a reunion with their families at Vance. At seven that Saturday morning, after heavy rain had fallen, the brothers went out to patrol the highways.

Bull Head Creek, normally a clear water stream that meanders lazily through the area, had swollen dangerously. The Roes had driven only two miles upstream on Ranch Road 2631 when they heard cries for help. They discovered two families of four adults and two children lodged high in a tree, across the main stream and surrounded by churning waters.

The Roe brothers patrolled RM 2631 when Bull Head Creek (background) rose on August 6. Bayles Roe made his famous swim here.



Bayles Roe (left) and his brother Everett (right) work in different districts, but they were together again on August 6 when they rescued two families from the angry waters of Bull Head Creek.

Bayles had a boat at their camp, but the waters were too treacherous to use it. He took rope and life jackets from the boat, went upstream, and the brothers proceeded to attempt a rescue.

Bayles donned a life jacket, shucked his shoes, and made his way 75 feet across the stream. He swam with the rope while Everett held onto the other end and followed as the current carried Bayles downstream to the flood victims. Then each end of the rope was tied to a tree and the rescue began.

First across the waters was the youngest member of the group, a six-year-old girl. Bayles outfitted her with a life jacket, cradled her in his arm, held onto the rope with his other hand, and carried her safely across. The others were given life jackets and were able to cross on their own.

The two families had traveled to their campsite in a pickup truck equipped with a camper, and a 1966 automobile. The pickup-camper, camping equipment and all their belongings, except the clothes they were wearing when forced up the tree, disappeared downstream. The only possession they found afterward was the automobile which had been carried only a short distance downstream.

The Roe brothers took the victims back to their camp in Vance, gave them breakfast, and made arrangements to get them back to San Angelo.

This rescue provided the first opportunity for Bayles to put into action what he had learned in a National Red Cross aquatic and first aid instructor's course in 1939.

In letters addressed to each of the Roe brothers, the Texas Highway Commission and State Highway Engineer D. C. Greer commended them for their courageous action:

"We are proud of the Texas Highway Department's tradition of helping people in trouble and proud of you for carrying on that tradition." ■

A welcome addendum to this story was a letter forwarded to TEXAS HIGHWAYS from District Engineer C. N. Parsons in Del Rio:

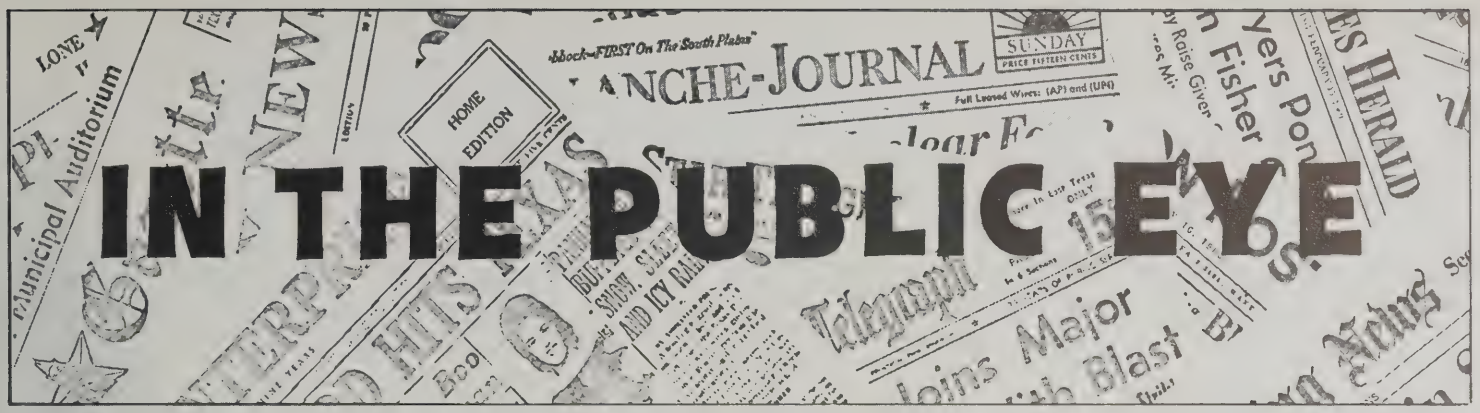
Dear Sir:

On Saturday, August 6, during the flood at Leakey, my husband's brother and his family lost their bus-camper and barely escaped with their lives. My husband and I arrived in Leakey with clothes and aid for them to find almost chaos in the area.

The one area of calm efficiency, communication, and helpfulness was your highway maintenance station with its crew of men, trucks, and radios. They were of great help to us, consistently courteous and patient.

My husband and I want to thank and commend Mr. R. S. Cox and all of his men and bring their courtesy to your attention.

Sincerely,
Mrs. Elmer McCoy Jr.
Seguin



EASIER, FASTER, SAFER

Dallas Morning News editorializes—"Despite the tragic toll of accidents and deaths on highways, Fourth of July travel in 1966 demonstrated the great debt the public owes to highway builders.

"Nationally, it is now possible to travel as many as 1,238 miles without a pause for a single stop light on the Interstate Highway System.

"In Texas highways are superb and they have been built economically and efficiently.

"To maintain such a record in the future will be difficult. Population growth and congestion will increase highway problems.

"Highways to meet tomorrow's needs can be built only by maintaining the highest standards of financing, administration, and planning for the future. The past has been possible largely because the public that used the roads paid for them; this principle of highway-user financing is sound and should be continued. Also, by all means, Texans must insist that the present able Texas Highway Department record be carried forward for the benefit of future generations."

TOTAL ROAD SERVICE

Glenda Petty in the **Wichita Falls Record-News** bylines—"With the approval of the $2,143,430, 1966-67 budget for the Texas Highway Department in this area, better highways are in store for motorists across the state. But the budget also includes funds for improvement of roads servicing only local needs, especially in rural areas.

"'Total road service to all the people, favoring none,' is shown in the number of projects improving not only Interstate and primary highways but also in the number of construction jobs on secondary roads.

"This area's highway department has recently completed a $303,900 project involving 32 jobs for putting a seal coat on various roadways, mostly farm to market routes.

"The FM projects currently under construction will provide serviceable roads for rural communities as well as providing connections with major highways throughout Texas."

WHOOPING CRANE HIGHWAY

Goliad Advance Guard reports—"Goliad's visions of a 'Whooping Crane Highway' are on their way to becoming a reality, with surveys by the Texas Highway Department expected to start immediately to complete right of way planning on the coastal link.

"The 'Whooping Crane Highway,' so named because it will provide Goliad with a direct route to the federal Aransas Wildlife Refuge near Austwell, is a pet project of the county's Commissioners Court and chamber of commerce.

"An extension of S.H. 239, the new road will run some 26 miles southeast through Goliad and Refugio counties to the junction of State Highway 113 and U.S. 77 north of Refugio.

"Goliad County's role in the project involved securing necessary right of way along the 18 miles the road will cover in this county. Judge R. L. Person said 'Most landowners have indicated they will give us the right of way.'

"Proponents of the new route have pointed out that it will provide a wide area, San Antonio included, with direct access to the midsection of the tourist coast."

AN EMERGENCY

Italy News-Herald comments—"The matter of access roads from Interstate 35E into Italy and Milford is becoming more serious with each passing day, and the probability that it may be as much as a year before the Texas Highway Department furnishes relief is a cause of growing concern on the part of business leaders. The situation has reached the proportions of an emergency, in the opinion of the **News-Herald.**

"Both Italy and Milford have held hopes of attracting new residents and new industries as a result of the expressway and the ready access it provides to Dallas.

"The first impression one gets on entering a community is often a lasting one, and there is little to favorably impress a 'looker' about the three-quarters of a mile of gravel road that must be traversed in getting from 35E to Italy's paved streets.

"Milford's situation is little better, except that their gravel road isn't nearly as long as Italy's."

INTERSTATE ROUTE PROPOSED

Amarillo Globe-Times reports—"The mayors of Oklahoma City, Wichita Falls, Lubbock, and El Paso met Monday in Lubbock and opened a drive for a federal interstate highway to link Oklahoma City with El Paso.

"The proposed highway would pass through Lawton, Oklahoma; Wichita Falls; Lubbock; Hobbs, New Mexico; and Carlsbad, New Mexico, en route to El Paso.

"The mayors formed the 'El Paso—Oklahoma City Interstate Committee.' They selected Lubbock for a headquarters because of its central location."

D-19 HOSTS PHOTOGRAMMETRY GROUP

"THE HARDEST WORKING committee of the Highway Research Board," was the way Texas Transportation Institute researcher Mc Shelby described the HRB Photogrammetry and Aerial Surveys Committee at their recent meeting in Austin.

The Texas Highway Department was host for the national group that met August 10-12 at the Villa Capri Motor Hotel.

Representing 14 states from Connecticut to Washington, 29 men from state highway departments, various federal agencies, research organizations, universities and private engineering firms met to discuss current issues in photogrammetry. Data produced by photogrammetric methods is used in every phase of highway planning, construction and design. Glenn Anschutz, engineer of photronics for the Kansas State Highway Commission, presided as chairman of the HRB committee.

In welcoming the committeemen to Texas, State Highway Engineer D. C. Greer said he was speaking for all highway departments when he claimed, "We are extremely hungry for that which you are producing."

Greer also remarked, "with all the modesty a Texan can command," that he believed the Texas Highway Department has the best photogrammetry outfit in the nation.

"The field is broad, the challenge great," he concluded. "What you do will make highway departments stand or fall."

William Pryor, chief of photogrammetry and aerial surveys for the Bureau of Public Roads, conducted a symposium on "Cadastral Surveying by Aerial Triangulation Methods." One other symposium was held, concerning automatic mapping. However, most of the committee meetings were spent discussing mutual problems informally.

Highlight of the three-day session was a tour of the Department's photogrammetry facilities. These facilities are acknowledged as being among the best-equipped in the nation and they appeared quite impressive to the experts from other states.

Many of the committeemen arrived in Austin a day earlier to attend a dinner meeting of the American Society of Photogrammetry, Texas-Louisiana Region. At that session, University of Texas Professor J. Neils Thompson spoke on "Why Go to the Moon?" Robert D. Turpin of The University of Texas is chairman of that group. ■

Hubert A. Henry, engineer-director of the Automation Division, tells how Texas does it. On his right is George P. Katibah, photogrammetric engineer, California Division of Highways; and on Henry's left, William T. Pryor, Bureau of Public Roads, Washington.

State Highway Engineer D. C. Greer welcomes photogrammetry committeemen to Texas. Seated on the left is committee chairman Glenn Anschutz, engineer of photronics for the Kansas State Highway Commission.

Members of the Highway Research Board's Committee on Photogrammetry examine several types of photographic presentations available from Automation Division, Photogrammetry Section, including photo indexes, enlargements, and mosaics.

The last ferry crossing is a sentimental trip for officials from two nations who had made the dream of a bridge between Rio Grande City, Texas, and Camargo, Mexico, come true. The $500,000 structure is at the southern end of FM 755.

New Bridge Spans Rio Grande

Dick Roberts
Travel and Information Division

SOMETIMES a new road or bridge is more than just a new route for America's motorists.

Sometimes it does more than provide a better route for bringing farm products to market; more than make easier access to a recreational spot; more than smooth the miles between commercial centers.

Sometimes a new road can cross more than land—sometimes it can bridge time, and turn a page of history.

Such a road is the extension of Farm to Market Road 755. Starting in the sparsely populated ranch land of Brooks County at the tiny town of Rachal, FM 755 slices southwestward through Brooks and Starr Counties. Formerly the highway ended at the busy marketing center of Rio Grande City, Texas, U.S.A.

FM 755 still stops in Texas, but now it ends at an "open door"—a new portal to Mexico.

On August 19, the reason for the extension of FM 755 came into being with the opening of a new bridge into Mexico—a link between Rio Grande City, Texas, U.S.A., and Camargo, Tamaulipas, Mexico. But the bridge did more than join these two cities; it forged another solid link between two friendly nations.

On the day of dedication, honor guards from the United States and Mexico raised their respective flags at the center of the bridge. As the flags climbed the staffs to meet the breeze, the national anthems of both countries sounded—each beamed in the direction of the nation to which it belonged.

Officials from Starr County and other dignitaries took sentimental trips across the Rio Grande on the old ferry. The now-obsolete ferry had been in operation since 1958 when it was pressed into service to replace a washed out pontoon bridge.

Herbert C. Petry Jr., chairman of the Texas Highway Commission and an honored guest at the ceremonies, described the new structure as a "bridge of friendship" and said its construction "sets an example to the world of neighbors who can work together." He described the bridge as an "area of friendship" and added that the people of the United States are always willing to work with their friends from the south to strengthen these bonds of friendship.

Representing Caminos y Puentes Federales de Ingresos, the Mexican federal agency which has the responsibility for toll roads and bridges in Mexico and with whose cooperation the new bridge was built, was Lic. Jorge Sanchez Teruel, director.

Sr. Teruel called the bridge an "open door" on the border, and saw it as an end to isolationism and a shortening of the political and geographic distance between Mexico and the United States.

He noted that the economic prosperity of border countries can exist only when shared by both countries.

But, said Sr. Teruel, the most important function of the new bridge is the bringing together of the human elements of the two countries.

As such a bridge to understanding, Sr. Teruel said that roads and bridges should be as dear to people as their treasured monuments.

The city of Camargo is one of the oldest cities in the Rio Grande Valley. Established in 1749 with 66 families, Camargo became the center from which cities as Mier, Laredo, and other Valley cities were founded.

Just 100 years ago Camargo made its place in history secure, for it was here that the colonial aspirations of France in the New World came to an end.

The event that convinced Napoleon III that his position was untenable was the Battle of Santa Gertrudis—fought between the soldiers of Maximilian under the command of a General Olevere, and the Mexican Liberalist forces under the

command of General Mariano Escobedo.

While 25,000 troops from the United States were held in readiness at Fort Ringgold in Rio Grande City, to assist the Liberalists, the Liberalist troops made an incredible forced march to Camargo to attack the lead elements of the French forces before additional contingents could arrive from Monterrey.

The ambush was set for an area where the French forces would be cut off from water, and water in fact played an important part in the battle.

The ambush took place on the Santa Gertrudis Ranch, about three miles east of Camargo, close enough for *barrileros*, or water carriers, to shuttle back and forth with their burro carts.

The Mexican troops ate bread prepared in an all-night baking session the night before by the women of Camargo.

The Imperialists lost 251 Mexicans and 145 Austrians killed, 121 Mexicans and 15 Austrians wounded, and 858 Mexicans and 143 Austrians captured in the all-day battle. The Liberalists lost 155 killed and had 78 wounded.

When word of the defeat of the Imperialist forces, which included the Austrian mercenaries and probably a number of ex-Confederates, reached the Imperialists en route from Monterrey, they turned back, and the power of France in Mexico went into a rapid decline. The "French Invasion" of Mexico was over.

Although small by today's standards, the battle is nevertheless well deserving of the monument that marks the site, since it also marks the end of an era south of the border.

Starr County Judge Dr. M. J. Rodriguez (left) said opening of the bridge will make 1966 a "landmark year" in the history of the county. With the judge are George R. Boyle, manager, Rio Grande City Chamber of Commerce, and Joe Guerra, Starr-Camargo Bridge Company.

Photographs by Jack Lewis

Multicolored ribbons representing the colors from the flags of Mexico and the United States are cut to open the new 600-foot bridge spanning the Rio Grande. Performing the symbolic chore are Lic. Jorge Sanchez Teruel, director of Caminos y Puentes Federales de Ingresos (left) and Herbert C. Petry Jr., chairman of the Texas Highway Commission.

Across the river, Rio Grande City is entering a new age, ending the rather placid life it has enjoyed as a ranching center since its founding in 1848. With irrigation waters from the great Falcon Reservoir and the new international bridge, Rio Grande City is destined to become a major border city.

In service today as a part of the Rio Grande City school system is historic Fort Ringgold. Named for Major Samuel Ringgold, the first American army officer killed in the Mexican War, the fort was established in 1848. Although due for deactivation in 1912, the fort was found to be needed because of border difficulties, and was enlarged in 1917.

Fort Ringgold was an active army post until August 1944, and horse cavalry was maintained there as late as 1943.

To the people of Rio Grande City and Ciudad Camargo, history is important. But neither city is living in the past.

At the bridge dedication it was obvious that the people of these cities are looking forward to increasing cooperative action between their cities, and to a future limited only by the imaginations of those lucky enough to be residents of this dynamic, growing area. ■

To Inform the Public

There is an old saying, "You can't stay mad at the fellow you break bread with." Reduced to its basic sense, this means that you understand a person you know.

The knowledge of the aims and policies of the Texas Highway Department by our bosses—the 10 million citizens of Texas—is as vital to the efficient construction and maintenance of highways as are asphalt and concrete.

But Highway Department employes need to understand these aims and policies, too. Three major aids to help our people to understand and to tell the highway story were sent to the district offices in mid-September. Produced by the Travel and Information Division, they are a movie, a slide set, and a set of flip charts.

The movie, "Texas Builds a Highway," is a 26-minute sound and color film that depicts graphically the many steps required to build a highway, some of the maintenance problems, additional Departmental traffic services, and highway needs of the future.

A slide set, "The Highway Story," closely parallels the movie. Fifty-two color transparencies explain the building of a highway from hearings to ribbon-cutting. A script narration accompanies each slide set.

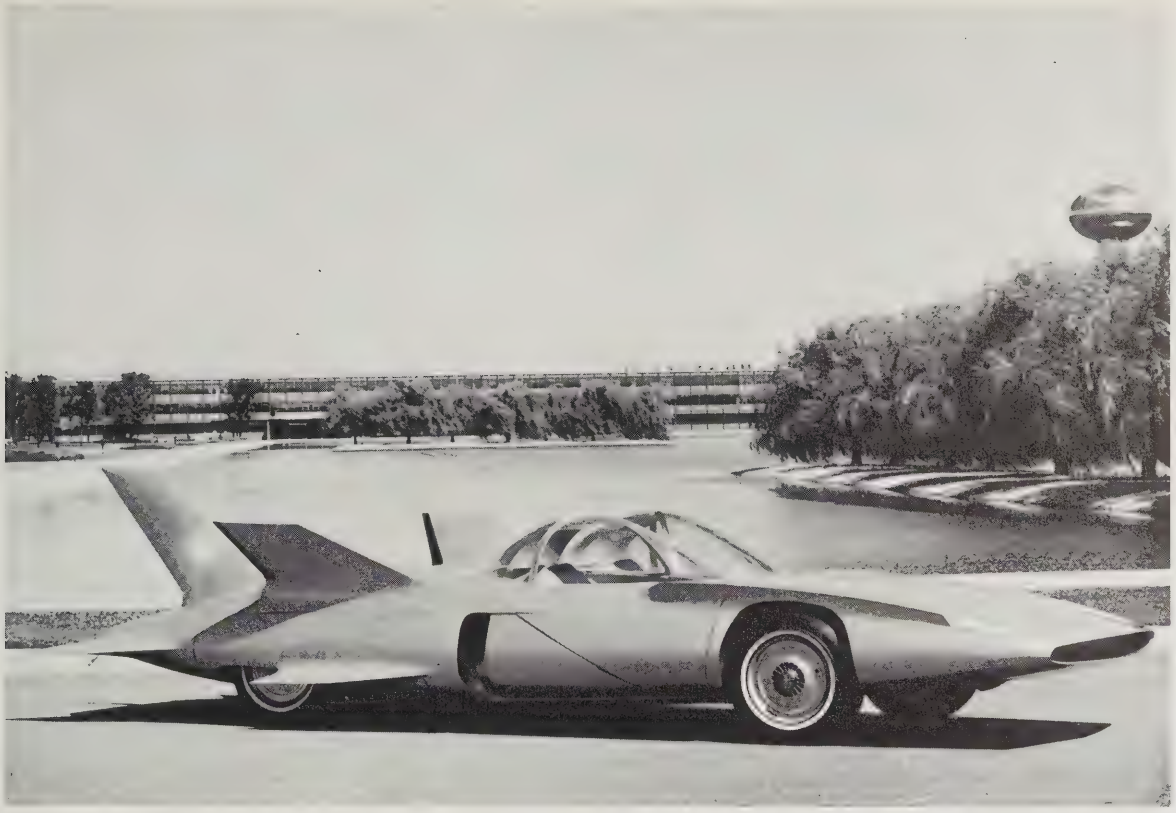
The third aid is a set of 12 mounted "flip charts." These charts, together with a printed booklet of notes, outline the needs, growth, financing, population shifts, safety and other topics relating to the aims and responsibilities of the Department. They can be easel-mounted for viewing by large groups, and tailored to fit the particular program for which they are used.

A brochure released by the Department in August spells out future highway needs and points to the challenge the people of Texas must face. The brochure, "The Great Challenge—Texas Highway Needs," although used extensively during Highway Week, is meant for year-round use. "The Great Challenge" has generated much favorable editorial comment from newspapers throughout the state.

A manual that shows the opportunities and challenges of a career with the Highway Department will be used by district offices to help recruit graduate engineers. The manual was due for early distribution in October. ■

Flip charts that outline highway needs, growth, financing, and other responsibilities of the Highway Department have been sent to district offices to help tell the highway story. Jan Hoover, secretary in the Travel and Information Division, adds beauty to the new charts.

Photograph courtesy General Motors



Film clips of a 1919 Ford and General Motors' Firebird III in action are shown in the Highway Department's new film, "Texas Builds a Highway." The two autos contrast highway travel shortly after the Department was born with what motorists may expect in the future.

AWARDS

(As of October 31, 1966)

40 Years

District 7
Walter A. Vannoy, Shop Foreman IV

District 15
Edmund A. Goll, Skilled Laborer

35 Years

District 6
Robert S. Shepard, Shop Foreman II

District 10
William A. Croson, Draftsman III

District 13
Vladimir J. Koss, Senior Resident Engineer

District 17
James C. Ely, Skilled Laborer

District 19
Herman E. Owens, Skilled Laborer

30 Years

District 12
William W. Hunter, Shop Foreman IV

District 16
Elwin W. Bull, Senior Resident Engineer

District 18
Millard O. Patterson, Skilled Laborer

25 Years

Administration
Fae B. Schacherl, Administrative Secretary

Motor Vehicle Division
Maude B. Shugart, Motor Vehicle Transfer Analyst

District 1
Oscar L. Johnson, Maintenance Construction Foreman II
Tidy T. Mabry, Semi-Skilled Laborer

District 8
Henry L. Balliew, Skilled Laborer
Hiram E. Beasley, Skilled Laborer

District 12
Douglas E. Parsons, Skilled Laborer
Willie J. Schultz, Chief Marine Engineer

District 14
Clarence C. Michalk, Engineering Aide IV

District 15
Hermann Hays Seele, Engineering Aide IV

District 16
Robert G. Lain, Skilled Laborer

District 21
James E. Foust, Semi-Skilled Laborer

District 23
Andy J. Taylor, Draftsman III

RETIREMENTS

Bridge Division
Henry M. Taylor, Supervising Office Engineer

Accounting Division
Flossie Sutton, Accountant II

District 2
Ira A. Williams, Maintenance Construction Supervisor II

District 5
Jessie J. McCullough, Semi-Skilled Laborer

District 9
Rufus T. Strother, Engineering Aide IV
Marshall H. Turnage, Motor Vehicle Mechanic

District 12
Carl C. Finke, Chief Marine Engineer
Joe C. Nerren, Shop Foreman IV
Willie A. Nesvadba, Skilled Laborer

District 13
Homer M. Burke, Skilled Laborer

District 15
Matthew K. Quinney, Skilled Laborer

District 17
Eugene Nobles, Skilled Laborer
Albert P. Sawyer, Materials Analyst III
Clement B. Thames, District Engineer

District 18
Walter H. Embrey, Skilled Laborer

District 21
Ruben A. McMullin, Maintenance Construction Foreman III
Luis Saenz Jr., Semi-Skilled Laborer

Black Bridge of the Brazos

THERE'S A HISTORY of building beautiful bridges in Texas, and it extends farther back in time than the Texas Highway Department.

The Black Bridge across the Brazos in District 17 is an example. Richly ornamented with ironwork, it was built with county funds in 1900. It spans the Brazos west of Calvert between Robertson and Milam counties with an overall length of 370 feet, composed of four approach spans and one steel truss span.

For 66 years cattle and produce trucks have lumbered over the two-by-four planks that make up the floor of the Black Bridge. But the bridge, though still beautiful, is no longer considered safe for heavy trucks.

"The bridge is particularly needed because the area is becoming a large cattle area and the huge cattle trucks cannot safely cross the present bridge," said Representative Milton Schiller. "The site is fast becoming a favorite recreation and fishing spot and with a new bridge the area would be most desirable."

Robertson-Milam county residents led by Representative Schiller sought help from the Texas Highway Department at an open hearing on July 28 at the Calvert City Hall. Jack Kultgen, member of the Texas Highway Commission, heard recommendations from Schiller, County Judge Gervase Reagan and District Engineer Joe Hanover, and then inspected the bridge and its surroundings.

Meeting in Austin on August 5, the Texas Highway Commission granted permission for construction of a new bridge. The new bridge will be an extension of FM 979 west from Calvert to the river. Along with the bridge, which will cost an estimated $400,000, the Highway Department will construct a 2.2-mile road from the bridge to FM 2347 at an estimated cost of $63,000. ■

Representative Milton Schiller inspects the Black Bridge, which he and a delegation from Robertson and Milam counties wish replaced with a modern structure. Hearne Democrat photograph by Joe Sam Sturgis Jr.

New Lines of Communication

"TELECOMMUNICATIONS capability" is the new operative phrase in the Automation Division's computation center.

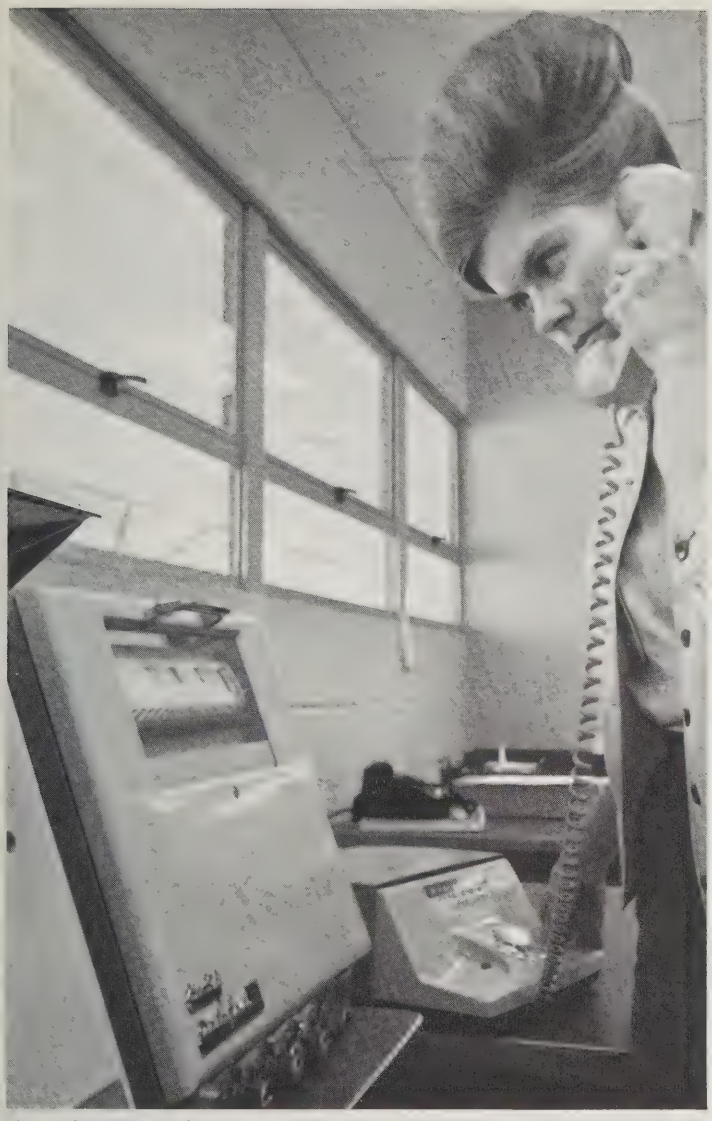
For example, a secretary in the Houston District Office inserts a sheet of paper into a machine, pushes a button marked "Data," and in the Austin computation center a sheet that is a duplicate of the one in Houston slowly slides out of a similar machine.

Two new pieces of "hardware" (that means equipment in computer parlance) in the Camp Hubbard computation center have this "telecommunications capability."

The other piece of hardware, Control Data Corporation's 3100 computer, makes use of telephone or teletype lines to receive or transmit data to other locations. It has a capacity of 16 channels —that is, information can be received or transmitted over 16 lines, to as many as 16 different cities, at the same time.

Included in the CDC 3100 system are two teletypewriters for transmitting data and a multiplexer. The multiplexer continually scans the 16 channels to find out if information is coming in on the teletype and if so, prepares the computer to receive it. In reverse, when information in the computer is ready for

Dean Taff, data processing supervisor in Automation Division, prepares to type commands to the CDC 3100 computer. The typewriter is an input-output medium; commands are entered into the computer by typewriter, and the computer types out data at 1,000 lines per minute.



Control Data Clerk Jennifer Smith at D-19 Computer Center in Austin pushes the "Talk" button and speaks to her opposite number at the Houston District Office by way of a WATS line telephone connected to the experimental Datafax machine. Then she will push the button marked "Data" and receive a duplicate of the material Clerk Typist Pat McCrary (right) inserts in the Datafax transmitter in Houston.

transmittal to a remote station, the multiplexer activates the teletype to send the message.

Replacing the 1401 computer, the CDC 3100 has other advantages. It can store 2,000,000 pieces of data on discs (four times the storage capacity of the 1401), and can retrieve any bit of it almost instantaneously. It has an input capacity of 1,200 cards per minute and can print out information at lightning speed—1,000 lines per minute.

Another advantage of the CDC 3100 is its "tape compatability" with the computation center's big 1604 computer. Tapes for the two computer systems are interchangeable.

Another method of telecommunications capability is being tested by means of the Dictaphone Datafax system installed to transmit via telephone lines facsimile copies between the computation center and the District 12 headquarters office in Houston.

Anything written or drawn on a sheet of paper can be sent in this manner. The copy is burned on heat-sensitive paper and looks like a Xerox copy. As the sheet of paper is fed into the Datafax at one office, it is being printed at the other. The process takes about six minutes for transmittal of material on a sheet of paper 8½ by 11 inches in size.

Al Castello, head of computer systems programming for the Automation Division, emphasizes that the Datafax is being tried on an experimental basis only, and there are no plans at present to set up the system at other district offices. Castello says the Division is also investigating other means of facsimile transmission.

These innovations at the computer center are in line with the Automation Division's stated purpose—to be an engineering service organization always alert to new processes to serve the Highway Department more effectively. ■

Highway Look in Kilgore

Texas Highway Commission member Jack Kultgen, third from left, joins East Texans during official opening of I. H. 20 linking Dallas and Kilgore on June 29. Inspecting the S. H. 135 overpass at I. H. 20 are Kilgore Mayor Foster T. Bean, Gregg County Commissioner Jack Bean, Kultgen, County Commissioner Hugh Camp of Sabine, District Highway Engineer W. W. Potter of Tyler, and Charles Devall, News Herald publisher.

The *Kilgore News Herald* ran one full page of highway photographs in an August edition, proclaiming " 'Future' Highway Look Arrives for Kilgore."

There was an accompanying story by Morris Shelton about highway work in the county. Part of this feature story:

"Almost a half million dollars was spent by the state during the past year for improvement of Rusk County roads, and an additional $553,000 worth of road construction is now under way.

"Roy Roberson, assistant to the Rusk County resident engineer, reported that the largest project completed was conversion of the portion of S.H. 42, which runs from South Kilgore to Laird Hill, into a four-lane highway. The cost was approximately $200,000. The section includes 1.7 miles in Rusk County outside the Kilgore city limits and was part of a two-mile improvement project. It was completed in May.

"In the making are plans for conversion of U. S. 259 into a four-lane divided facility that will run from the South Kilgore city limits to Pitner's Junction, a distance of approximately 5.2 miles. The additional two lanes for traffic will be separated by a 44-foot 'depressed median.' "

Four photographs of major highway projects in the city and county are shown on these pages.

Interchange of I. H. 20 and U. S. 259 nears completion about two miles northeast of Kilgore. This will be one of the major interchanges between Dallas and Shreveport and is being built for high speed access and exit.

Kilgore News Herald Photos by Tom Fatherree

A major highway improvement in Kilgore in the past year was converting Laird Hill Road to four lanes. It carries heavy oilfield traffic for both S. H. 42 and S. H. 135 and is scheduled for a new surface later this year.

F. M. 2204 (Stone Road) was recently widened to four lanes, complete with curb and gutter, from its intersection with U. S. 259 eastward to the Kilgore city limits at Danville Road. The improved section gives easier access to a growing residential area and the Gregg County Airport.

For Better Maintenance

SHOULD THE Texas Highway Department maintain drainage facilities in small towns that do not have the necessary equipment to do the job?

Should the Highway Department install private and access drives in small, incorporated cities as it does in rural areas?

Should traffic be discouraged from using paved shoulders as traffic lanes?

Hired mowers versus State-owned mowers: which are better?

These questions and 150 more were batted around and "answered" at the first regional maintenance conference held in the Dallas district headquarters from August 8 through 10. Thirty-four maintenance engineers from Districts 1 (Paris), 2 (Fort Worth), 3 (Wichita Falls), 9 (Waco), 10 (Tyler), 11 (Lufkin), 17 (Bryan), 18 (Dallas), 19 (Atlanta), 23 (Brownwood), and from Maintenance Operations Division in Austin attended the meeting.

District Engineer B. L. DeBerry welcomed the maintenance men to District 18.

"Our maintenance problems are greater than ever today and the problems are increasing," DeBerry said. "All your skills and ingenuity will be required to solve these problems. I'm sure this meeting will go a long way toward helping us solve these problems."

Roger Spencer, Maintenance Operations Division, Austin, said there had not been a maintenance conference in several years.

"We thought a regional meeting would be better than a state-wide meeting because of the informality, and because more people would have an opportunity to speak," Spencer told the conferees. He said districts were chosen for the conference on the basis of geographic location where problems were similar.

Maintenance Engineer Grover Green, District 18, was moderator and host for the meeting. It was his difficult task to keep the discussions moving so that the 154 questions could be covered by noon on the third day. All 25 districts and the Houston Urban Office had submitted questions to be discussed.

Twenty-seven questions were listed under the "Signs" category, by far the largest category of questions submitted. Question 20 in this group drew several negative comments. The question: "Due to the size, maintenance problems and cost of the R2-9A sign at the district line on non-controlled access highways, we recommend that either the size of this sign be reduced or that it be placed at the state line only."

The R2-9A sign is 16 feet long by five feet deep and spells out the maximum legal speed limits for house trailers, trucks, and truck trailers.

Most of the maintenance men thought this type sign was unnecessary on FM roads, and that it was ridiculous to list truck speed limits, since "Truck drivers know the laws better than anybody."

Bill Davis, District 2, Fort Worth, suggested the signs be put along only those highways shown on the Official State Highway Map. Joe McDowell, District 1, Paris, said he would like to see the R2-9A sign policy changed.

Another question concerned washing Interstate signs. At least one of the districts represented will soon start washing the giant signs. Equipment and Procurement Division has the necessary washing equipment for this type operation.

Sam Roper, Maintenance Operations Division, said that about 60 per cent of the signs in Texas have been converted to the American Association of State Highway Officials requirements.

Ray Brown, Maintenance Operations Division, reminded the group that the deadline for replacing yellow stop signs with red ones is November 1967.

The next discussion was on pavement markings. "I think it is false economy to build a highway and then not center stripe it," McDowell said. "It is a safety factor, and I think we should put stripes on all roads."

Grover Green's overwhelming task is to move the discussions through 154 questions in two full days for the Highway Department's first regional maintenance conference. The District 18 maintenance engineer was host and moderator for the meeting in Dallas.

The conferees went "on record" that the Department should stripe all roads.

One of the maintenance engineers said that he found placing linseed oil over the old center stripe before applying a new coat of paint will help reduce flaking. The results are excellent on concrete pavements, he added.

Spokesmen from eight of the 10 districts agreed that blading fire guard lanes should be done on request, but only on private property.

McDowell revealed some startling figures about mowing operations. He said he kept records on one stretch of I.H. 30 near Greenville using a 15-foot mower the district had bought. He also kept records on hired mowers for this same area. Savings with State-owned mowers ran 32 per cent. "I didn't believe it. I ran it again and the cost didn't vary one per cent from my first cost records."

Robbie Martin, District 23, told the highwaymen that his district bought 15-foot mowers and gradually switched over from hired mowers to State-owned. He saved 20 per cent by using Department forces. "We're sold on it," added Gordon Smith, assistant district engineer.

District 2 "does a great job" with the 15-foot mowers.

But Bill Bockman reported a different story in District 17. He said the district changed to hired mowers in 1965 and saved $15,000 from the previous year

of State-owned mowers. McDowell was for hiring mowers. District 10's Loran Thompson said he kept records and although costs were about the same THD forces did a more thorough job. "But I don't want to buy any more mowers," he added.

The discussion then turned to icy bridges. Most districts agreed that using gravel instead of sand or salt is more effective in icy weather. George Cleveland, District 9, said a fine aggregate is better than sand because it does not have as much moisture and is less likely to freeze.

Some of the liveliest discussions were about access driveways. McDowell said flatly, "Driveways take up too much of the maintenance foreman's time. It sure would turn a lot of our maintenance people back to road work if we got out of the building end of this. We may put in 200 driveways a year, and one job can take a whole day to complete."

The maintenance men agreed that their districts cooperate fully with the towns in replacing driveways where a highway is widened inside the city limits. One engineer thought there was a discrepancy in Department policy about what sort of businesses the Department can build driveways for outside city limits. It is the responsibility of driveway owners to install the drainage pipe and to see that it remains unclogged.

McDowell asked that the group go "on record" as to whether traffic should be discouraged from using paved shoulders or whether shoulders should be built strong enough for traffic. All districts voted for building shoulders strong enough to support traffic. They also agreed there are adequate means now to solve the shoulder problem.

A few of the districts wanted to eliminate inside shoulders and use the money saved to widen the outside shoulders, because the inside ones are so seldom used.

Frank Ragland, District 3, said wide shoulders where trucks can pull over is one of the most important safety features on Texas highways.

"Modern, courteous truck drivers today move over," added Roy Johnston, District 19. "He'll go to the edge of the pavement no matter how wide the shoulder." This was in answer to the suggestion that paved shoulders be made narrow to discourage their use as traffic lanes.

Jack Cooper, District 2, had another idea. "I don't like the idea of a narrow shoulder because there isn't enough room for emergency parking. If you want another lane, build it, then put a shoulder on that. I'm trying to get away from this dual purpose we have."

Edge striping is out. Yellow curb marking is out. Median edge lining is in and should be placed 12 inches from the curb, eight inches wide. This line needs to be raised slightly because dirt and water can make it invisible.

Three skid trailers for measuring relative slickness of pavements are being built by Equipment and Procurement Division in Austin. The trailers will be placed at regional warehouses for district use.

The Department's nail picking machine is still being used on special occasions. For example, the machine was called in recently when a truck loaded with roofing nails spilled thousands of them along several miles of highway. The machine is available to districts upon request.

Most districts agreed that the only way to protect the highway investment in small towns is to handle the drainage problems.

Should the Department secure outfall channel easements for all cross drainage structures? McDowell said the Department should not go to contract unless it has channel easement, and that it would be even better to purchase the necessary property instead of the easement. Loran Thompson said his district recently settled a drainage problem after two years of negotiating, and the work could have been done in two hours if the Department had had an easement.

The second regional maintenance conference, consisting primarily of coastal districts, met in Corpus Christi September 12-14. The third meeting, for the western districts, was held October 3-5 in Abilene.

Highwaymen at the first meeting in Dallas voted unanimously that a regional conference should be held every year. ■

Photographs by Marvin Bradshaw

A discussion of the type base and surface used to repair highway freeze damage draws the attention of 34 men from 10 districts and the Maintenance Operations Division.

To and From Our Readers

Synchronize Your Watches, Men

Dates for the Fortieth Annual Highway Short Course have been changed to December 13-15, 1966. The change was necessary because of a conflict with the meeting of American Association of State Highway Officials, reports Jack Keese, executive officer of Texas Transportation Institute.

The Short Course will begin with a general session on December 13, as in the past.

For help in making or changing room reservations, write Office of Continuing Education, Memorial Student Center, Texas A&M University, College Station.

Eviction Problem Dogs Sherrod

Right of Way Engineer A. H. Christian recently received a plea for help from Odessa District Engineer Archie J. Sherrod:

"As I recall, we were instructed during several District Engineers' meetings to contact D-15 in the event we had an eviction problem . . .

"There is a section where we have purchased the right of way, and an entire village is occupied. I see these occupants each time I pass but so far have been unable to serve eviction notice on them since they go in and refuse to answer the door.

"Knowing your abilities as a public relations man, I thought perhaps you could give me some advice as to how to handle this problem, especially since you grew up in West Texas and are familiar with West Texas citizens. There were only a few occupants about a year ago, but the population has increased immensely, and I hesitate to go to construction and force the citizens out with a bulldozer.

"Any advice you can give me as to the proper procedure for eviction of prairie dogs will be appreciated.

"P.S. Hurry up. I think there's a new crop about to arrive."

More Highway Facts

Here is another interesting tidbit from the *Guiness Book of Records:*

Highest Highway: The highest pass ever used by traffic is the Bodpo La (19,412 feet above sea level) in western Tibet. The highest carriageable road in the world is the 733-mile long road between Tibet and Southwestern Sinkiang, completed in October 1957. It takes in passes at altitudes up to 18,480 feet above sea level.

A Gentle Reminder

It's not too late to make a pledge or turn in your contribution to the United Fund, reminds Secretary of State John L. Hill. Hill is Chairman of the State Employes Division for the 1966 United Fund Campaign.

Fiscal Fellows Fete

District fiscal officers and accountants will gather in Austin October 19 and 20 to discuss payroll procedures and general Highway accounting matters.

State Highway Engineer has cautioned that reservations for lodgings should be made well in advance because other meetings and activities scheduled for Austin during that time may make accommodations hard to find.

It Had To Happen Sometime

A new Interstate highway in Pennsylvania and a bridge meant to carry it missed each other by 11 feet.

Unfortunately, the error was not discovered until after construction of the bridge was well underway.

A section of I.H. 95 must be relocated to correct the error, at an estimated cost of $31,000.

Blame it on the computer!

"WE'D BETTER SCRAM . . . IT LOOKS LIKE NEUGROT HAS FOUND AN OLD FOOTBALL!"

TEXAS HIGHWAY COMMISSION

HERBERT C. PETRY JR.	Chairman
HAL WOODWARD	Member
J. H. KULTGEN	Member
D. C. GREER	State Highway Engineer

Texas Highways

TEXAS HIGHWAYS, official journal of the Texas Highway Department, is published in the interest of highway development in Texas and for departmental education in construction, maintenance, and operation.

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Month of the Hero

August was truly the month when Highway employes showed their mettle.

Too late to be included in our story entitled "Highwaymen Save Flood Victims," came this report from Mrs. Fred Molter of San Antonio:

"On August 16 my husband and I were swimming in the Frio River near Garner State Park on the road to Utopia. I was caught by an undercurrent of water and washed through a large pipe under the road. I came out into swift waters on the other side. I started yelling for help. A Mr. Billy Downum of Leakey, an employe of the Highway Department, heard me yelling and came into the river to help me. Although the water wasn't deep, it was rough enough to knock a person down. Without a thought of his safety, Mr. Downum was brave enough to save me from further battering by the river.

"I understand there is some kind of merit for this act of courage given by the Texas Highway Department, and I certainly feel Mr. Bill Downum is entitled to this citation."

Sun Valley Meet

Seven administrative officers represented the Highway Department at the annual meeting of the Western Association of State Highway Officials held September 4-9 in Sun Valley, Idaho.

Attending from Austin were State Highway Engineer D. C. Greer, Assistant State Highway Engineer J. C. Dingwall, Chief Engineer of Maintenance Operations John A. Waller, and Director of Travel and Information Tom H. Taylor.

Three district engineers also attended: Brooks Evans (Waco), John Keller (Beaumont), and Tom K. Wood (Austin).

Think Astronomical

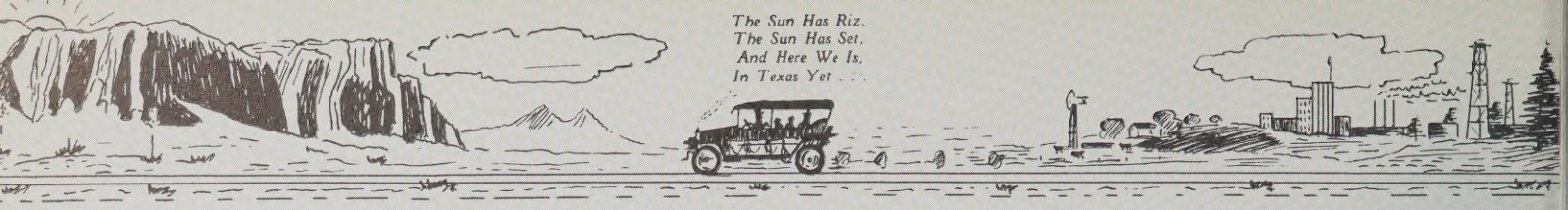
In 1975, federal officials say total motor vehicles in operation in the U. S. will increase from today's 93 million to about 120 million. Vehicle miles traveled are expected to soar in the next ten years from the current 880 billion to 1.2 trillion miles per year!

Garden Spot of District 16

Blooming oleanders have made Corpus Christi the Garden District, thanks to Highway Department landscape men. This scene appears at the interchange of State Highway 9 and U.S. 77 in Patricio County. The grounds of district headquarters are equally beautiful, our reporter Russell Reeb reports.

Photograph courtesy of the *Panola Watchman*

Back to school time in Carthage is a red letter day at the Thomas Hunter home. Supervising Resident Engineer Hunter marched seven off to Carthage schools last month, including (from left): Martha, 6, first grade; Mary, 9, fourth grade; Tommy, 11, sixth grade; Peggy, 13, eighth grade; Becky, 15, sophomore; Loretta, 17, senior; and Kathy, 18, freshman at Panola College. Next year there will be eight little Hunters in Carthage schools when five-year-old Karen takes her place in the procession, leaving only Robert, 3, at home.



OVER THE HIGHWAYS

Comments . . . from the Traveling Public

•Please accept this expression of my most sincere appreciation for the courteous reception and complete cooperation you and your staff gave to the Division of Defense and Disaster Relief during the period May 12 to August 12, 1966, immediately following the Presidential declaration of a major disaster area caused by flooding in 27 counties of northeast Texas.

Your Planning Survey Division, under the direction of Mr. Joe E. Wright, worked long hours under adverse conditions to complete the difficult and laborious task of providing an engineering survey of damaged roads and bridges and to prepare written estimates on areas affected by the flooding. These reports were submitted promptly and accurately, permitting my office to complete project applications for financial assistance in the time allotted by Public Law 875.

Mr. Wright and his staff were most productive in solving problems that required skill, tact and finesse and their accomplishments were always in the highest tradition of public service.

Homer Garrison Jr.
Director
Texas Department of Public Safety
Austin

•I have a small ranch in Real County. During the weekend of August 12-14 a heavy rain hit this area and produced 16 inches of rain in the mountains. The flood waters came in a rush and I could not get out. On Sunday my partner and I decided to work our way out on foot with the aid of ropes. We succeeded in reaching the highway with the aid of some of your employes.

I realize that the Texas Highway Department has long been known for rendering assistance to people during floods and other crises. However, I have been in public service myself for 50 years and I appreciate most of all the spirit in which your people operated in this emergency.

I wish to commend Ramon M. Ramirez, Reynaldo M. Galindo and supervisor John T. Templeton, and also the supervisor who works out of Rocksprings, Bayles Roe. These men will keep the reputation of the Highway Department in great shape.

Victor H. Braunig
San Antonio River Authority
San Antonio

•On the 17th of July I was having my troubles on the highway between Lampasas and Goldthwaite. Your Mr. Richard Corner of the Planning Survey Division came to my rescue.

I would like to tell you how grateful we are to him and to his Department for the training which he has received in working for the State of Texas. Mr. Corner acted every bit of the gentleman which I am sure he is.

Please give him my thanks once again for helping me and for the jack and tools it required to replace my boat trailer wheel.

Hugh G. Nance
Tyler

•I am a 13 year old boy learning how to drive, but there is no really safe place to drive. This is the reason I wrote, because I would like to make a suggestion. Why not cut off, or make, some special roads just for persons learning to drive? On regular roads they cause a traffic hazard and endanger lives. I think there are many people who would like a safe place to practice their driving.

Would you take my suggestion into consideration? I would appreciate it.

John Droll
Dallas

•Not just one occasion have I been stopped by one of your flagmen, but many times over the highways of Texas.

Not once have I not been greeted as if I were home, and asked in a kind manner to please observe the safety signs ahead.

To you and all your crew I want to personally thank you for your consideration of just another motorist.

Dick Ramsey, D.V.M.
Odessa

•The most enjoyable part of our trip to Galveston was getting to ride on your ferry. We enjoyed watching the splashing of the waves and the way the sea gulls came right down to the ferry. Few of us knew the ferry would be large enough to hold cars and buses.

We hope that we can come again.

Mrs. Greene's Class
Jane Long Elementary
Freeport

•My wife and I have just completed a week's tour of western Texas and New Mexico, having also headed in this direction two years prior on a trip which included Arizona and Nevada. In none of the other states did we find any roadside parks or rest areas which even slightly compared with those we encountered when we returned to our native state. We think the most spectacular and beautiful roadside park was that above the Pecos River bridge on U.S. 90 out of Del Rio.

We noted on this last trip that the Department is now providing litter barrels alongside the highway, and this, of course, makes the service to travelers much more complete. May we say "thanks" to you and to the Department for an operation of which all Texans surely can be proud. Our compliments to you and the Department, and, of course, to Governor Connally for a job very well done.

Richard F. Beck
Victoria

•My parent and I are coming here because this is the best state of the United States. We are coming on vacation and we would like to know where places are. Any information like a map about where streets are at.

I would like to live in Texas, but my mother is a Hoosier and she doesn't like to move anywhere. Thank you for your time and trouble.

Dale Henderson
Indianapolis, Indiana

•Yesterday I stopped at a roadside park on Highway 82 immediately east of Dickens to have a snack and rest. As I threw my waste in the trash I made the very bad mistake of throwing my car keys away also. After trying in vain to recover my keys from the "bottomless" trash can, I asked a truck driver to take me to the Highway Department garage in Dickens. There I told your men my trouble, and I just want to say "thank you" for their kindness and help in getting my keys back for me. They went to a great deal of trouble to help me.

I want you to know your men at Dickens sure seem to have a very sincere desire to help the motorist on the highway.

Jack Burford
Keller

Flagman Basilio Villanueva stands guard as District 14's Royce Mundine and Carl E. Anderson bolt cast aluminum adaptor with breakaway characteristics to concrete foundation. Set on the adaptor, the light standard with its steel transformer base will withstand hurricane winds, but will yield instantly if hit by a vehicle. District 14 has just completed adapting 309 standards, and now every light in the district is of the breakaway type, with the exception of those protected by guard rails.

Headquarters for America's space program rises on the shores of Clear Lake south of Houston. The specially-designated NASA Road 1 (crossing lower right corner of picture) provides access to the center from I.H. 45 and S.H. 3.

Photograph by Photogrammetry Section